Development Technologies Overview

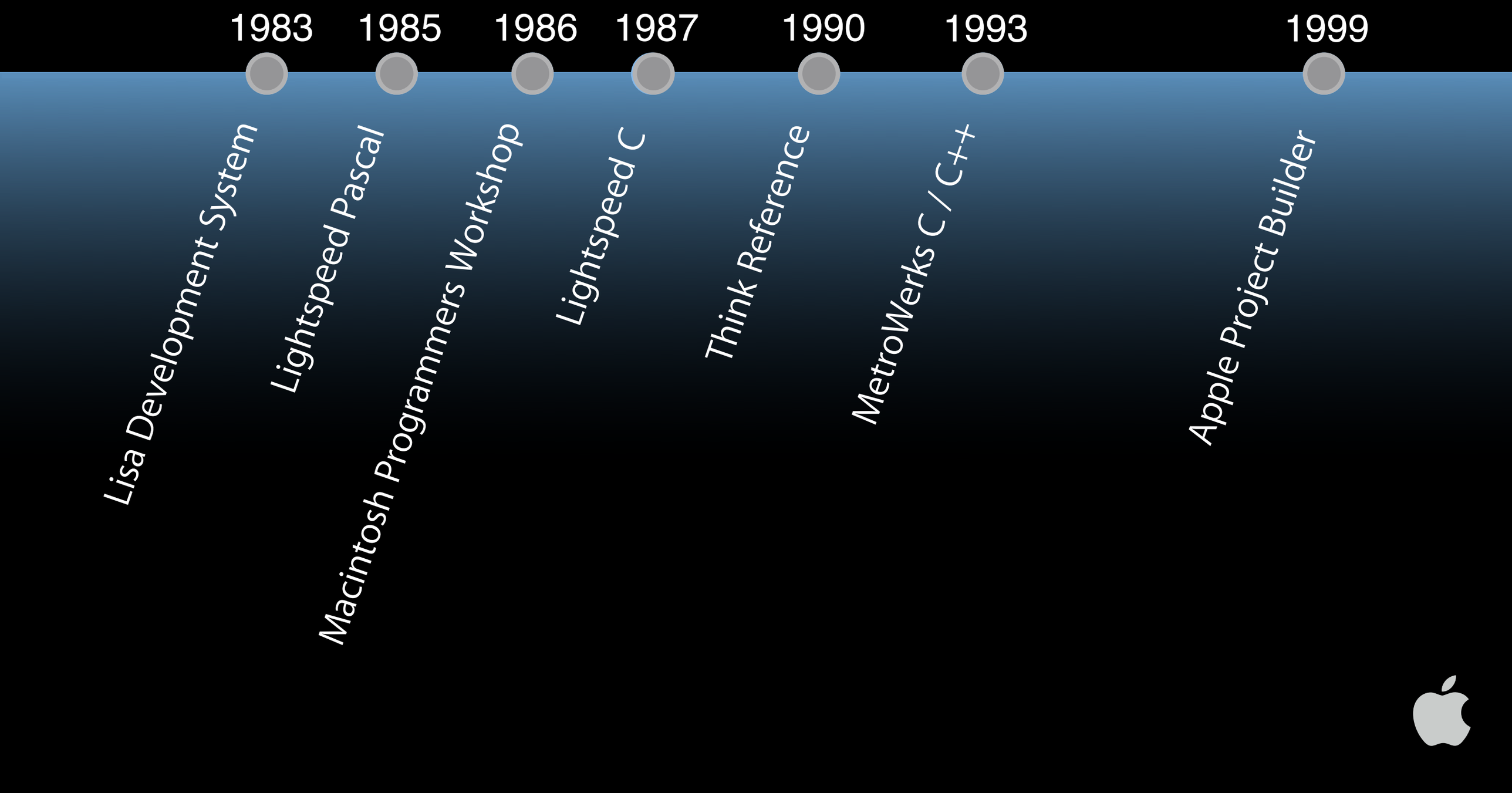
Session 300

Development Technologies Overview

Ted Goldstein
VP Development Technologies

A Great Legacy

Developers Have High Expectations



We Can Do Better

Improving Programmer Productivity

Rapidly Develop
New Ideas

Find and Fix
Problems

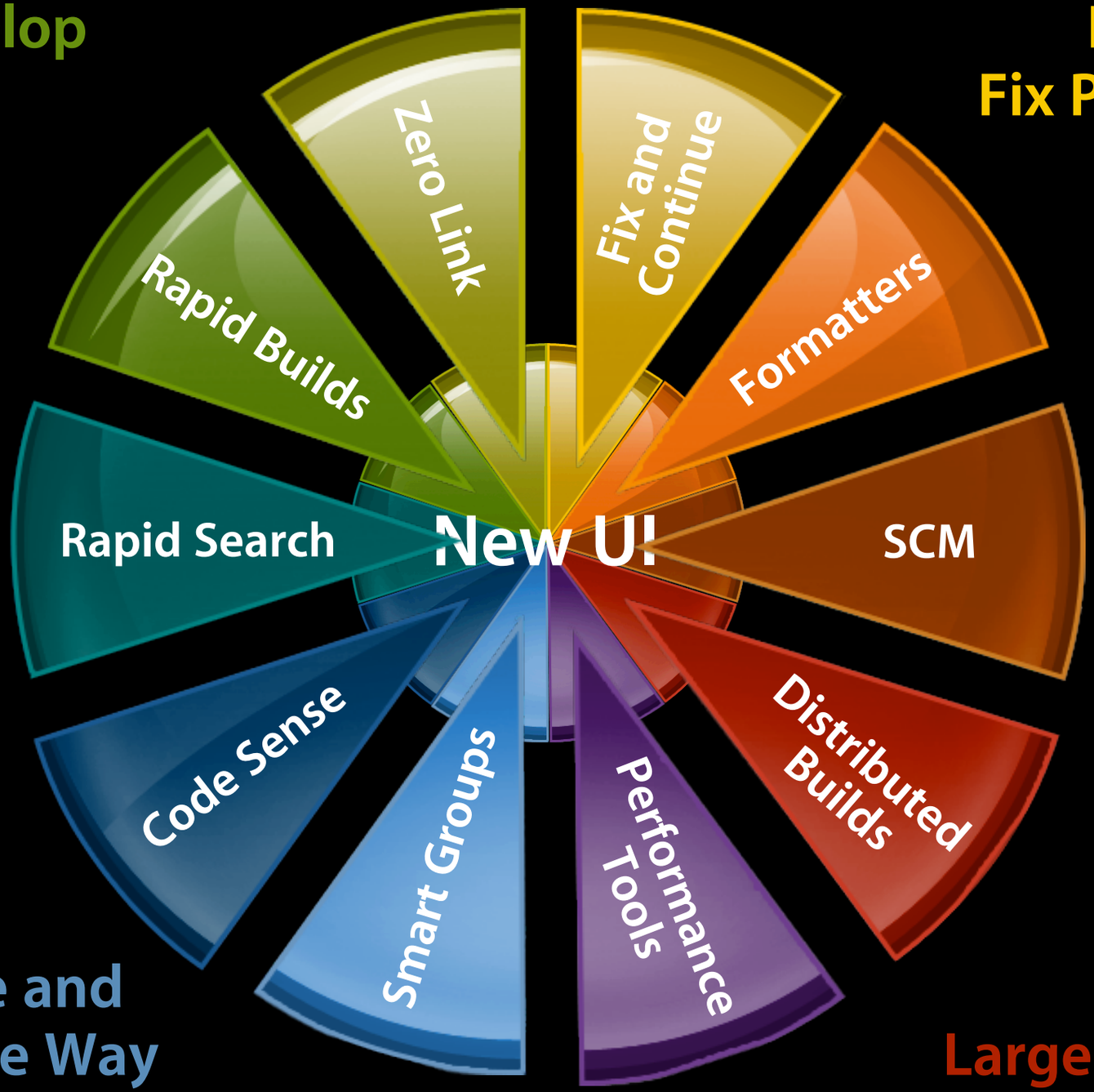
Get Me There and
Get Out of the Way

Manage
Large Projects

Improving Programmer Productivity

Rapidly Develop
New Ideas

Find and
Fix Problems



Get Me There and
Get Out of the Way

Manage
Large Projects

Meet Your Needs

- Familiar UI
- Fast
- Works as you expect
- Features you love

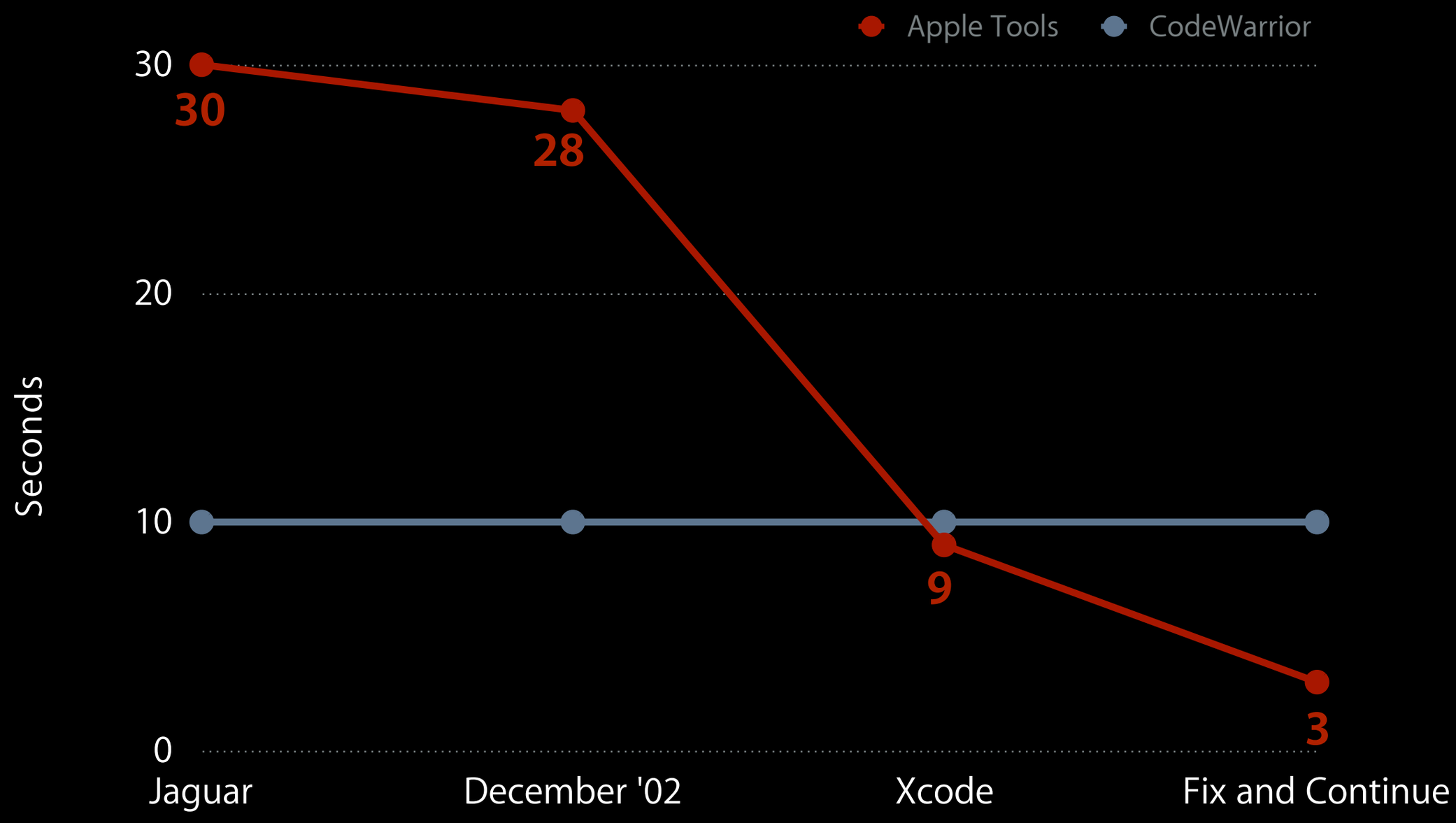
Exceed Your Expectations

- New User Experience
- Distributed builds
- Fix and Continue
- Zero Link

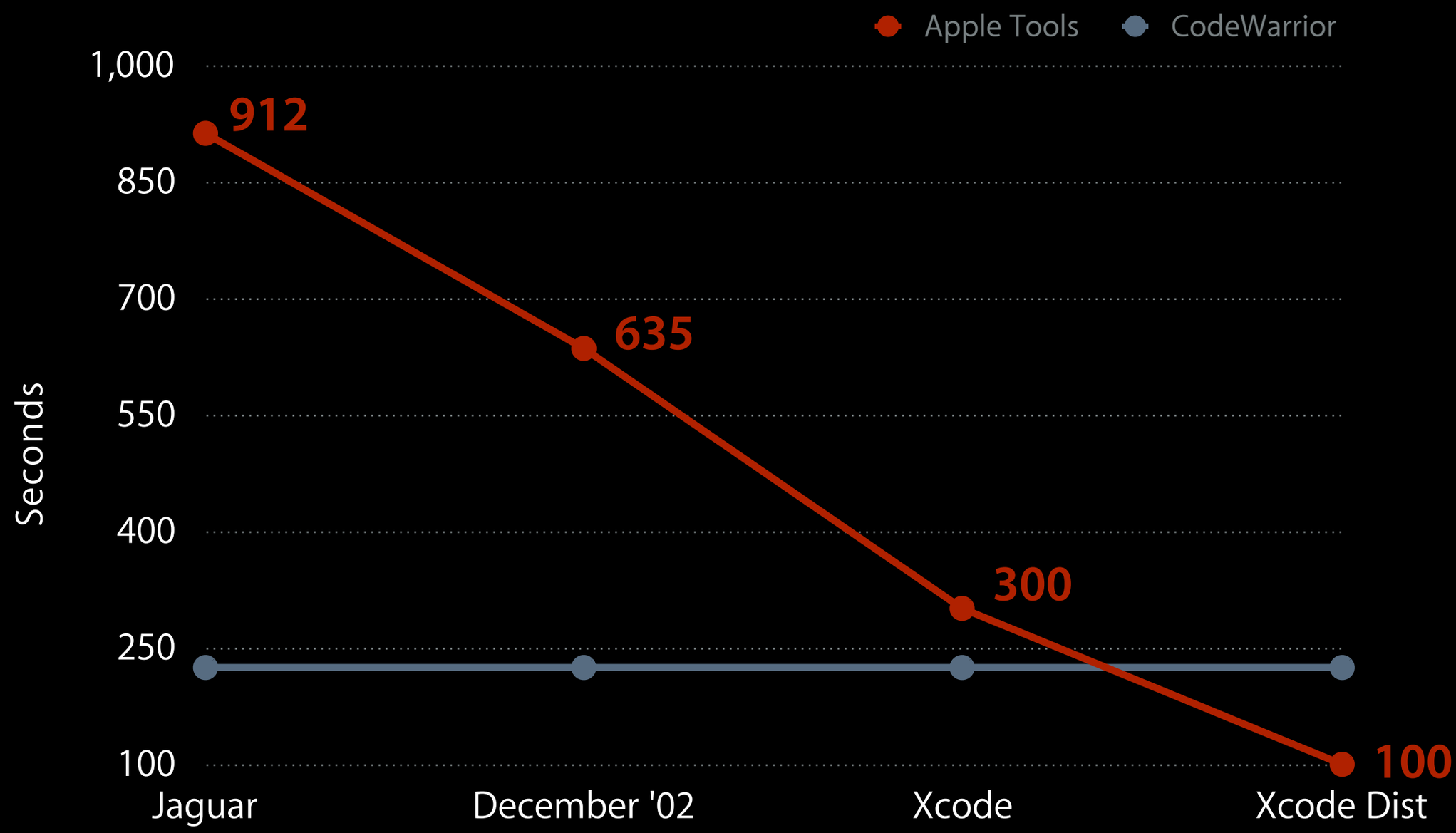
Xcode: The Fastest Way to Create Mac OS X Applications

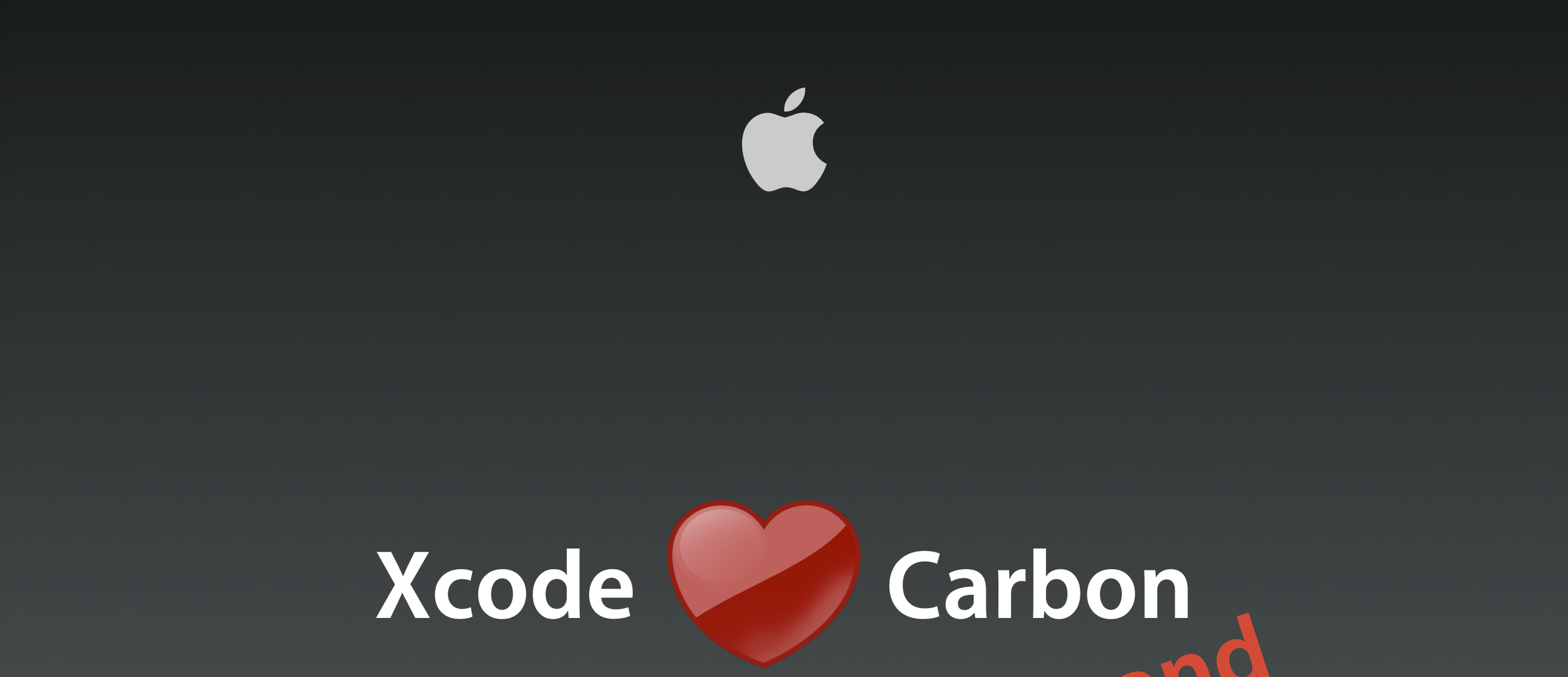
- Fast to learn
- Fast to use
- Fast for debugging
- Fast generated code

Single File Turnaround



Full Build


Apple Tools
CodeWarrior
1,000
850
700
550
400
250
100
Seconds
912
635
300
100
Jaguar
December '02
Xcode
Xcode Dist


Xcode
Carbon
and
C++

Features for Carbon and C++

- Break on C++ Exceptions
- SDK
- Formatters
- Distributed builds

The Xcode Xperience

Steve Naroff
Senior Technical Director

Fit and Finish Consistent With the Apple Brand

Demo

Xceeding With Xcode

Toni Trujillo-Vian
Director of Interactive Tools

Native Build System

- Maintains build state at all times
- Enables
  - Immediate feedback in the UI
  - Fast single-file compiles
  - Predictive compiler
  - Parallel and Distributed builds

Xcode Target Types

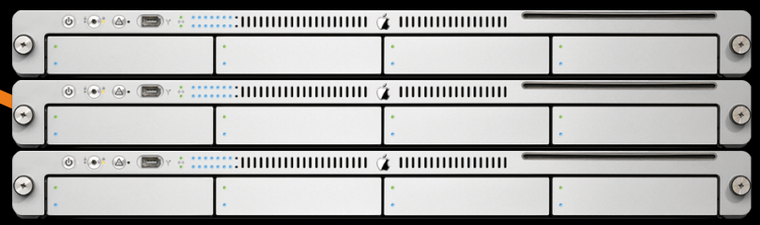
- “Native” targets
  - Flexible
  - Extensible rules
- Project Builder targets
- Custom-built targets

Distributed Builds

Harness your workgroup into a build fleet

Developer

Work Group

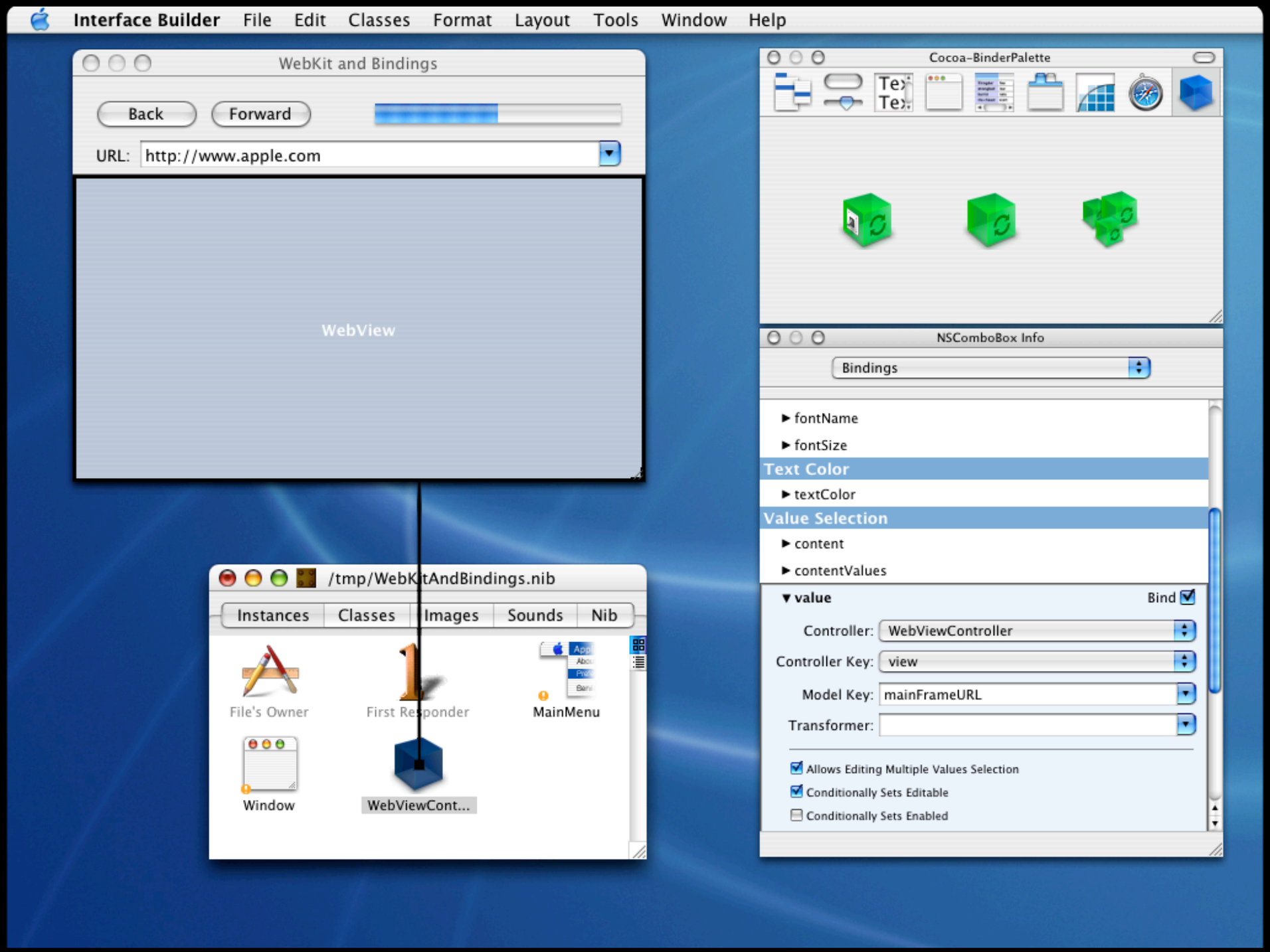


Build Fleet

Demo
Distributed Builds

Stan Jirman
Manager of Xcode Engineering

Cocoa Bindings



GCC

Ted Goldstein
VP Development Technologies

Compile Smarter and Faster

- Old precompiled headers
- Improved precompiled headers
- Tune memory management, algorithms
- Predictive compiler
- Distributed build

GCC Performance

- Tighter, better code
- SPEC Mark
- Tuning for G5 architectural features
  - Benefits from ILP (Instruction Level Parallelism)
  - Long execution pipeline
  - IO channels can keep up with execution units (including Altivec)

GCC 3.1 vs. 3.3 for G5

- Benchmark improvements of 10–30%
- Some apps have improved by 40%
- Even 5% of well-tuned code by better alignment flags

Your mileage may vary

SPEC® Benchmarks

- Single threaded performance:
  - SPECint_base2000
  - SPECfp_base2000
- Multi-process throughput performance:
  - SPECint_rate_base2000
  - SPECfp_rate_base2000

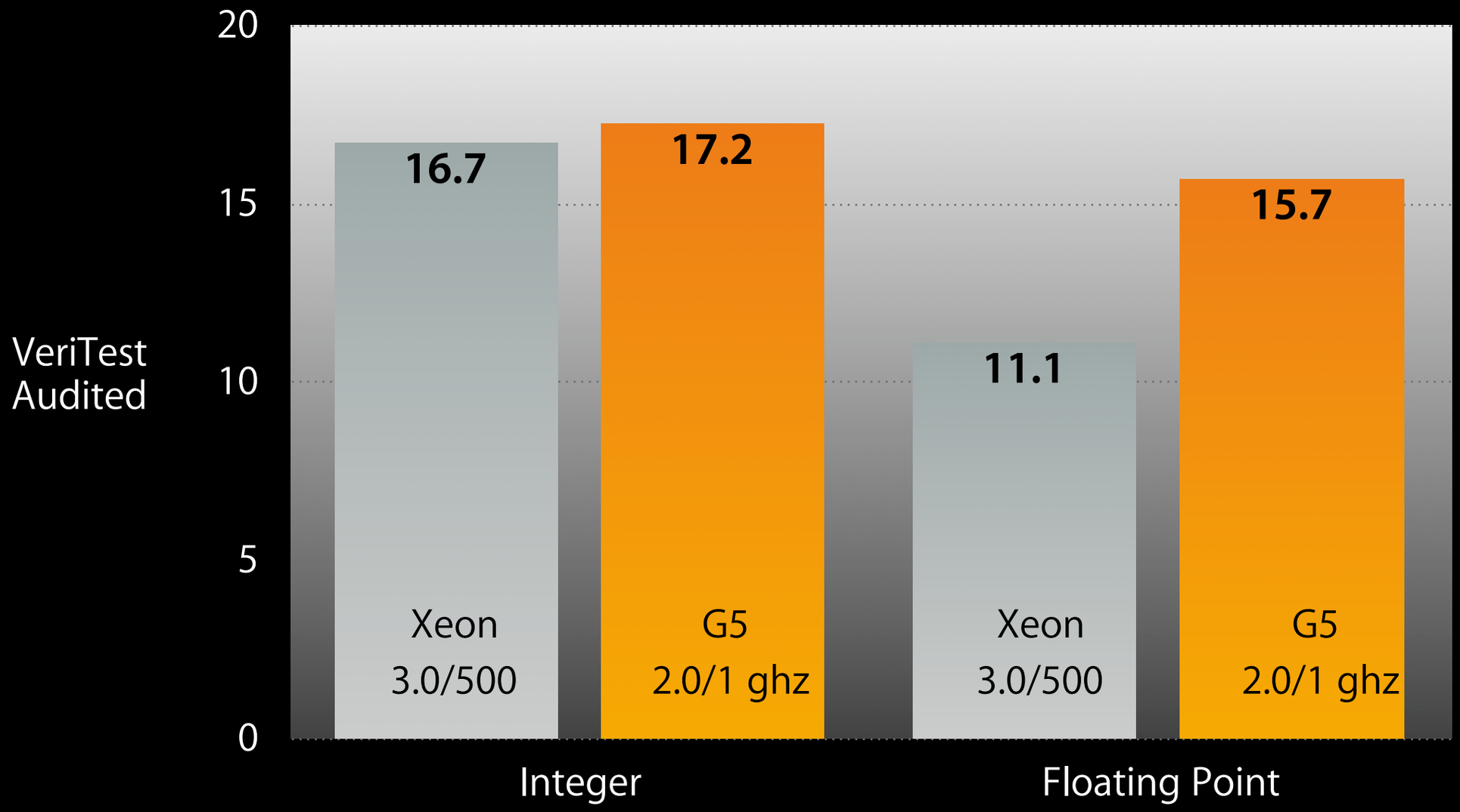
Numerical Algorithmics Group Fortran 95

VeriTest Using CPU 2000

- Power Mac G5 system
  - Dual 2.0 ghz / 1 ghz
- Dell Dimension 8300
  - Single Pentium 4 at 3.0 ghz / 800 mhz bus
- Dell Precision 650 system
  - Dual Pentium 4 Xeon at 3.0 ghz / 500 mhz bus

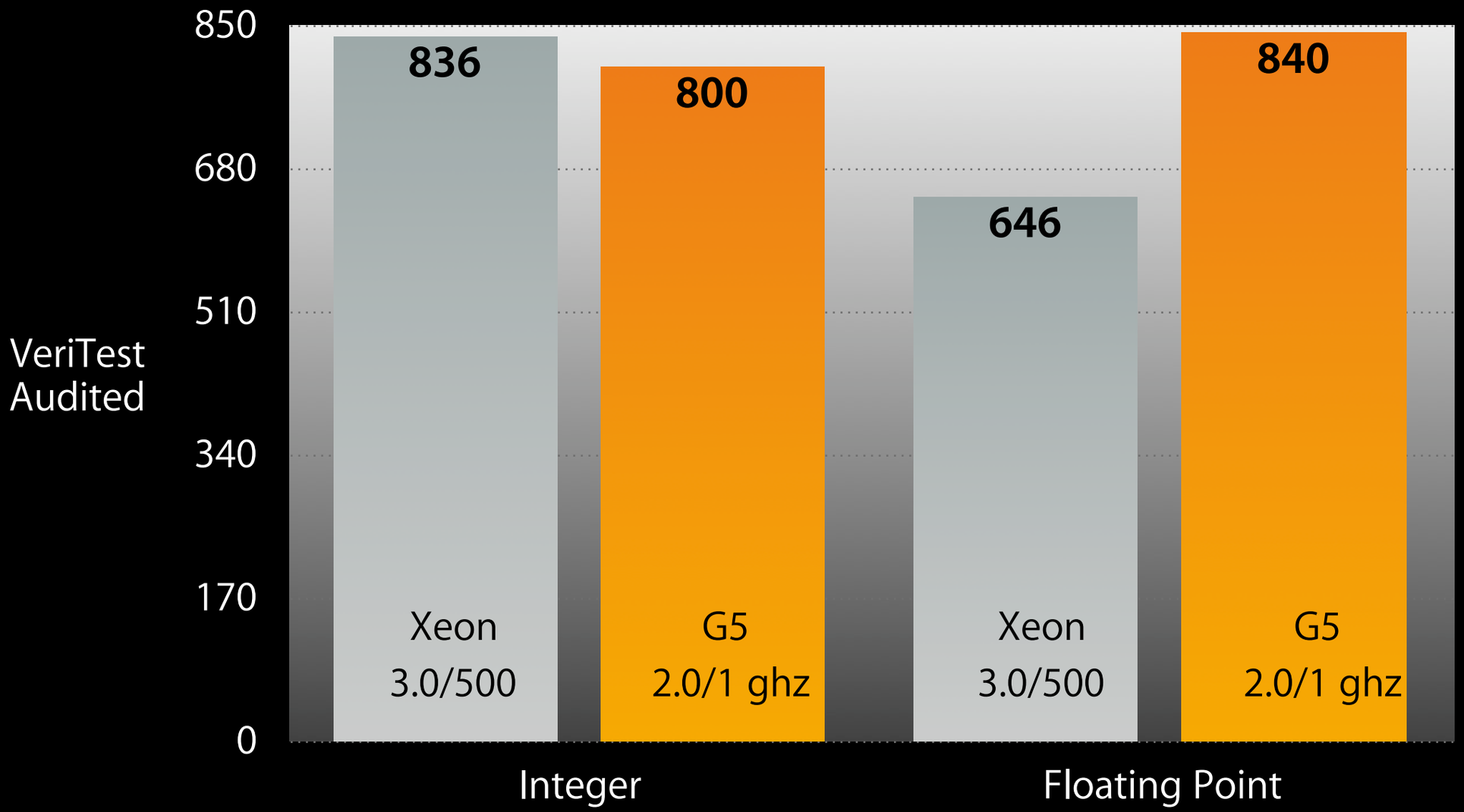
SPEC Rate 2000

Dual Xeon vs. Dual G5/GCC 3.3



SPEC CPU 2000

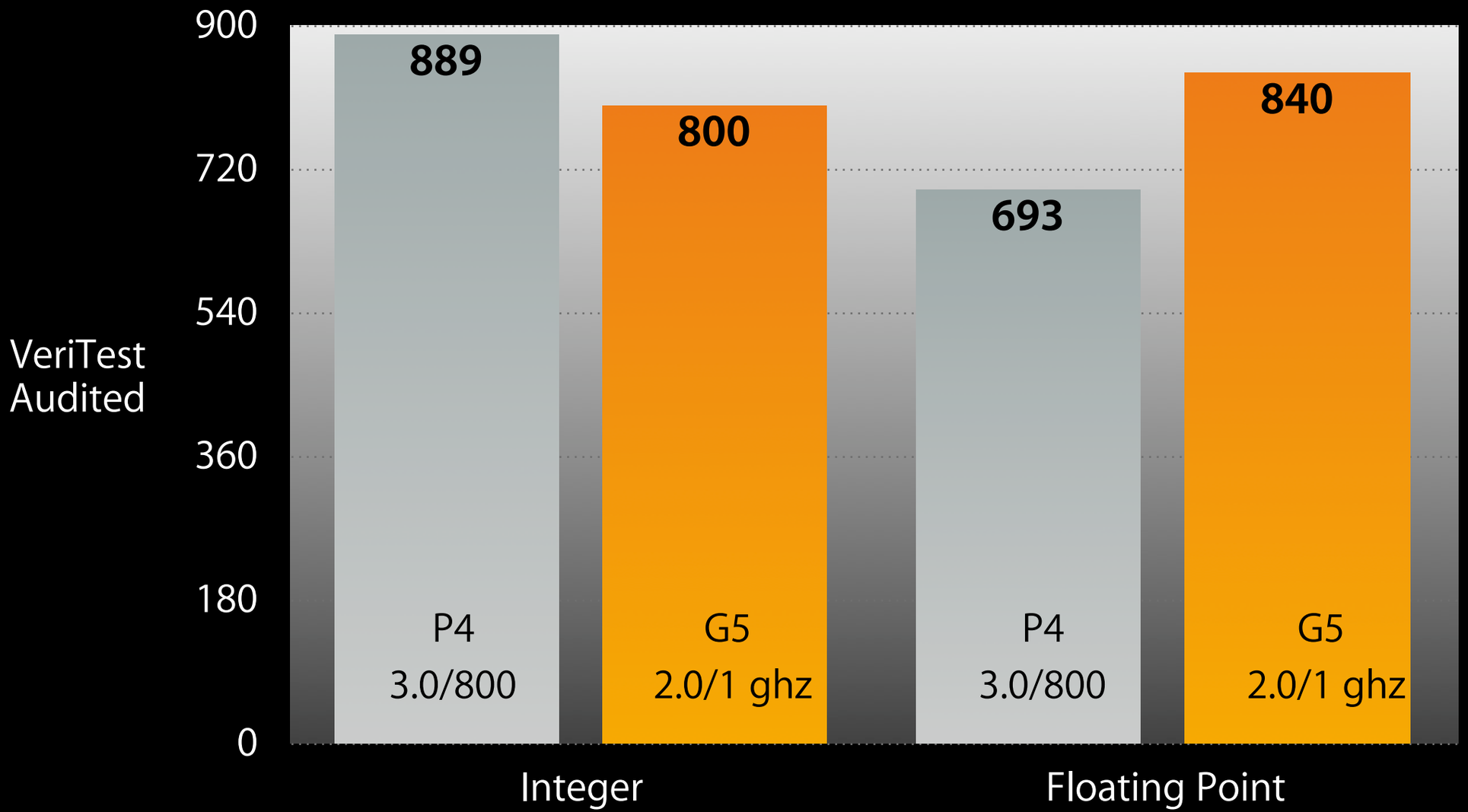
Single Xeon vs. G5/GCC 3.3



SPECint_rate_base2000 SPECfp_rate_base2000

SPEC CPU 2000

Single P4 vs. G5 CPU/GCC 3.3



SPECint_rate_base2000 SPECfp_rate_base2000

Xcellerating Your Applications

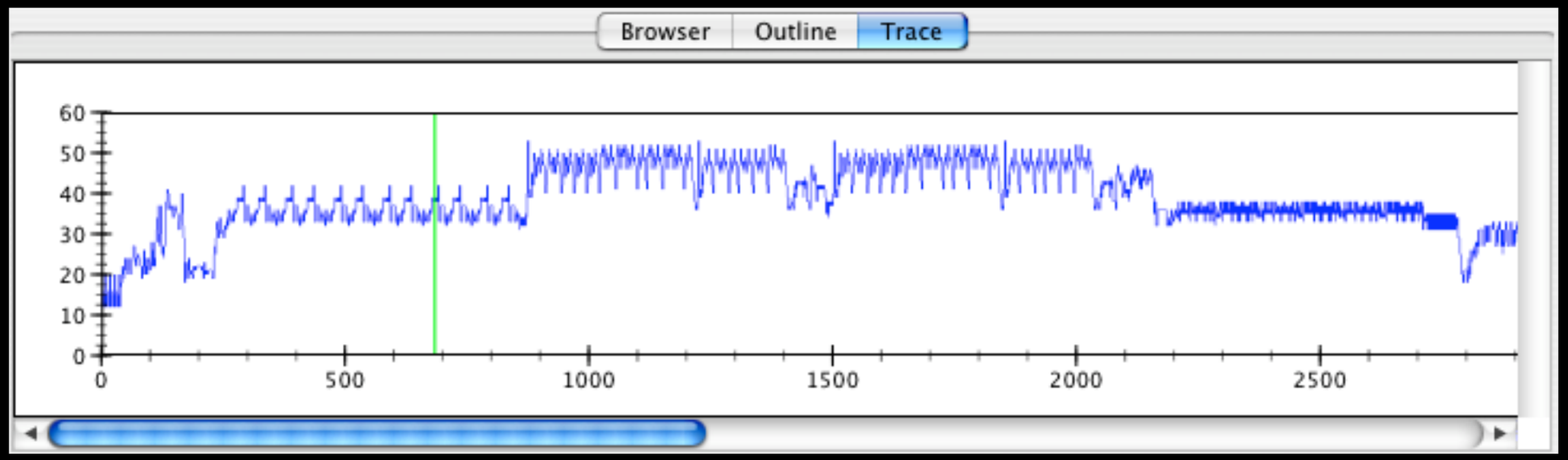
Dave Payne
Performance Tools Manager

Examining Performance With Xcode

- Application-level profiling: Sampler
- Memory use analysis: MallocDebug
- Object use analysis: ObjectAlloc
- Processor-level profiling: Shark

New Ways of Studying App Behavior

- Profiling with Sampler
  - Examine call stack trees
  - Watch dynamic behavior with event tracing



New Ways of Studying App Behavior

- Profiling with Sampler
  - Examine call stack trees
  - Watch dynamic behavior with event tracing
- Auto-sample user interaction hangs with Spin Control

CHUD Tools 3.0

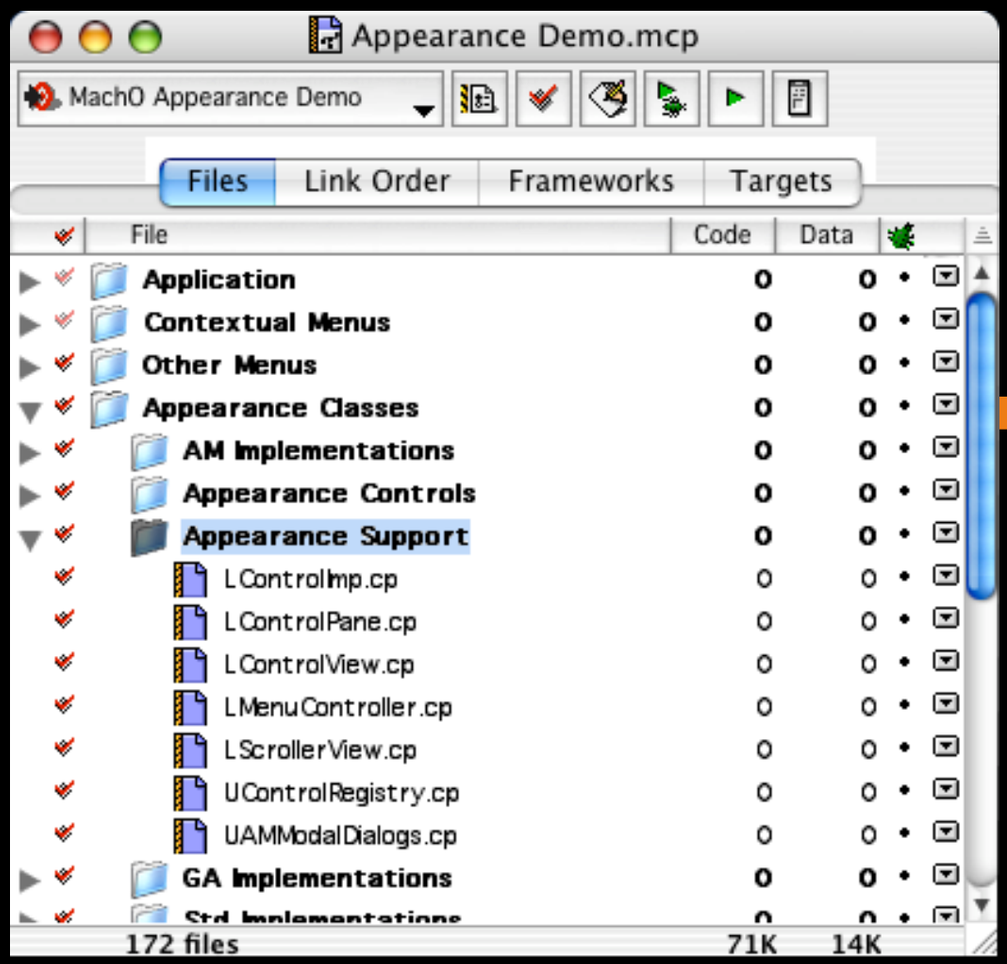
Computer Hardware Understanding Developer Tools

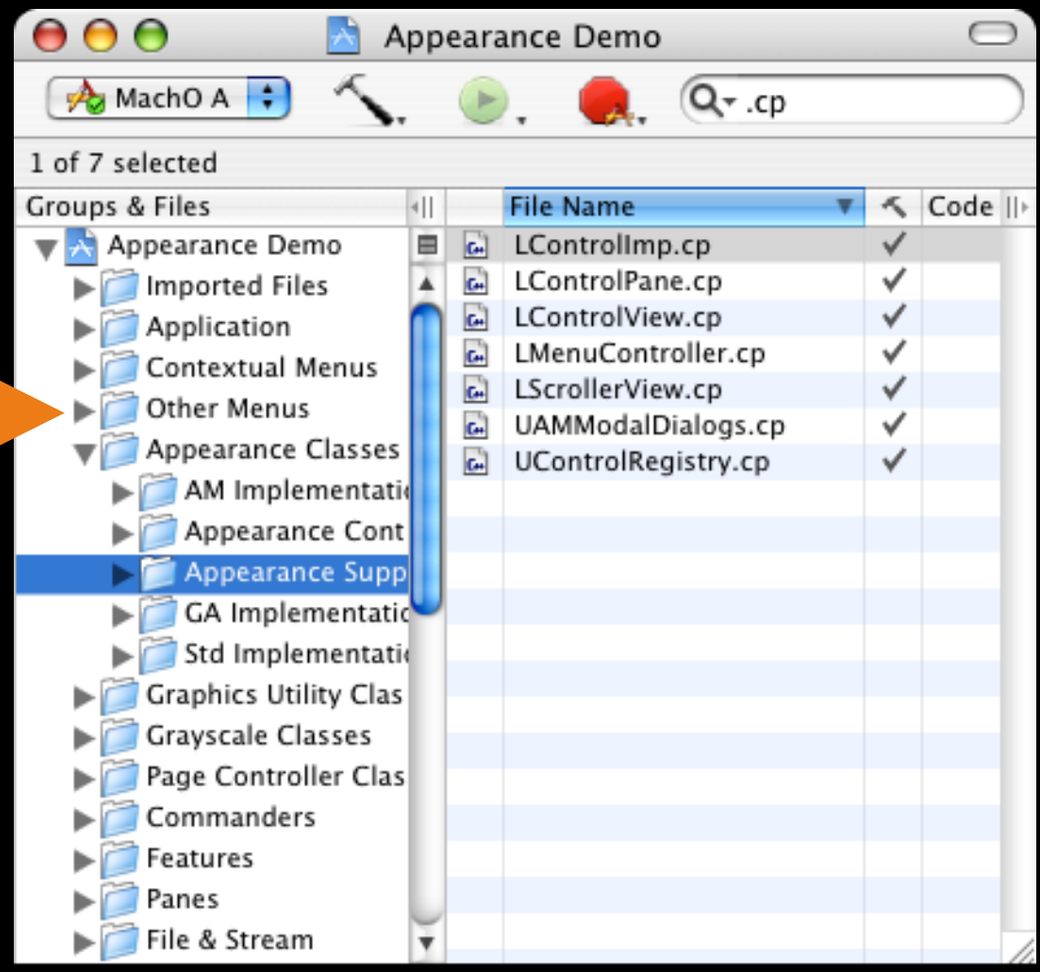
- Low-level access to performance monitors
- G5 optimization tips and processor modeling
- Shark—instruction-level profiler
- MONster—spreadsheet for performance events
- Additional tracing and CPU simulation tools

Demo

Xcellerating Xcode Adoption

Importing From CodeWarrior to Xcode



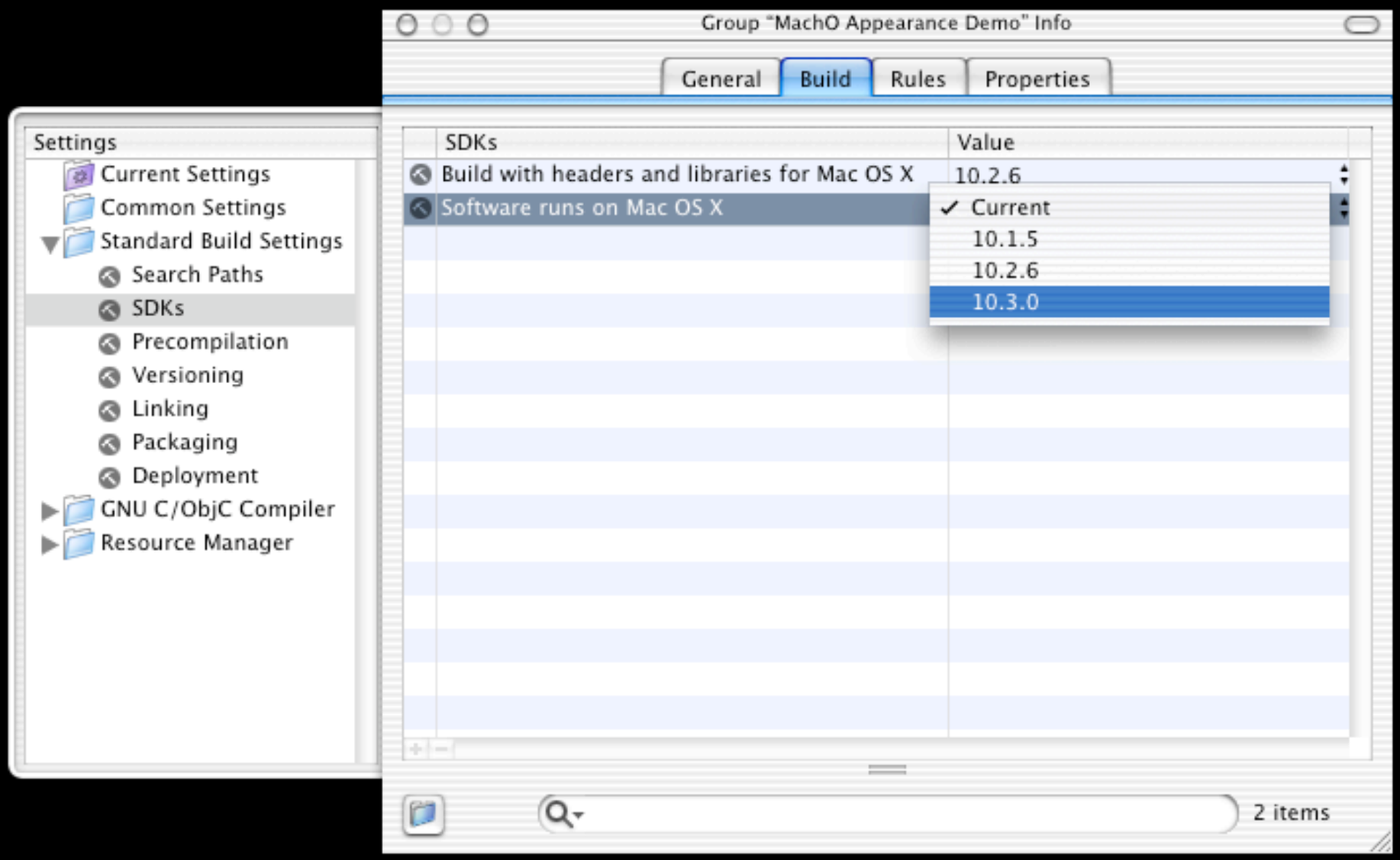


Source Code Compatibility

- CodeWarrior-style assembly in GCC
- wchar_t
  - Built into Panther
  - Dinkumware library for Jaguar

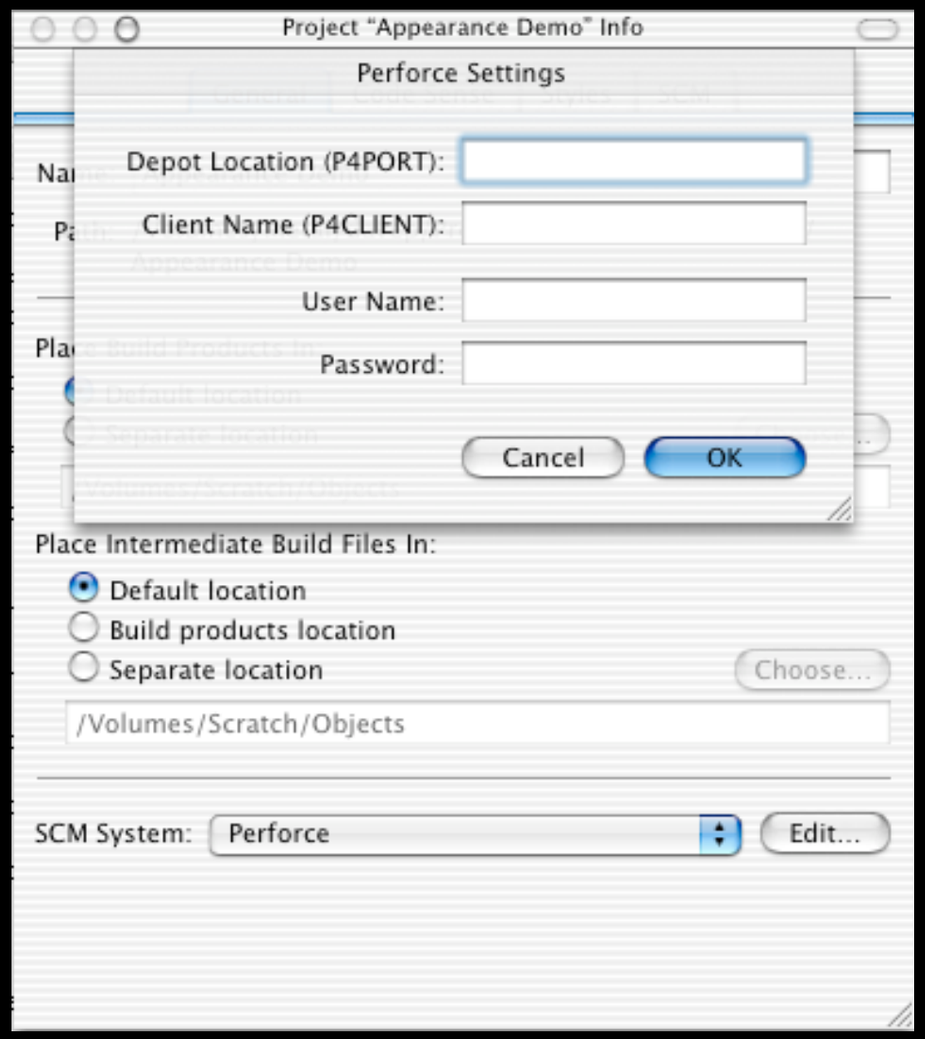
SDKs

- Run one version of Mac OS X, develop for another
- Header files and stub libraries



SCM System Integration

- Perforce
- CVS



Switching to Xcode

- Xcode enables fast development of fast applications
- We’re making it easy to switch

Xtraordinary Futures

Ted Goldstein
VP Development Technologies

The Future Is So Bright, You'll Have to Wear Shades

- GM
  - Faster yet
  - Java and WebObjects support
- Beyond
  - Inter-modular feedback directed optimization
  - Enterprise application development

Remember, It's a Developer Preview

Remember, It's a Preview

- One or two bugs… File bug reports!
  http://developer.apple.com/bugreporter/
- Send other feedback to:
  xcode-feedback@apple.com

Wrap Up

Summary: Xcode

- Fast
- Removing obstacles to adoption
- Integrate all tools under Xcode umbrella
  - AppleScript
  - WebObjects and Java
  - C/Objective-C/C++ compilers
  - Performance tools

Roadmap

601 Java Overview State of the Union The latest and greatest about Java on Mac OS X	**The Mission** **Mon., 5:00pm**
602 WebObjects State of the Union Get excited about what's coming for WebObjects	**The Mission** **Tues., 9:00am**
302 Introduction to the Apple Dev Tools We've shown you Xcode. Now learn the details.	**The Presidio** **Tues., 3:30pm**
304 GCC In Depth Learn all about Apple's work on the GCC compiler	**The Mission** **Wed., 3:30pm**
412 Cocoa User Interface Programming Details on new Cocoa Bindings	**The Presidio** **Wed., 3:30pm**
309 Developer Tools UI: A Case Study An in-depth look at how Xcode came to be	**SOMA** **Thurs., 3:30pm**

Contact Points

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http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference